APPLYING CORRELATION COEFFICIENTS — EDUCATIONAL ATTAINMENT AND UNEMPLOYMENT

TEACHER VERSION

Subject Level:
High School Math

Grade Level:
9-12

Approx. Time Required:
120 minutes

Learning Objectives:

- Students will be able to make scatter plots of data.
- Students will be able to calculate correlation coefficients using technology and by hand.
- Students will be able to assess the strength of a linear relationship using correlation coefficients.
- Students will be able to determine the impact of an influential point on the correlation coefficient.

Activity Description

Students will use state and regional unemployment data for various education levels to create scatter plots and calculate correlation coefficients. Students will then compare scatter plots with different strengths of linear relationships and will determine the impact of any influential points on the correlation coefficient.

Suggested Grade Level:
9–12

Approximate Time Required:
120 minutes

Learning Objectives:

- Students will be able to make scatter plots of data.
- Students will be able to calculate correlation coefficients using technology and by hand.
- Students will be able to assess the strength of a linear relationship using correlation coefficients.
- Students will be able to determine the impact of an influential point on the correlation coefficient.

Topics:

- Educational attainment
- Correlation coefficients
- Influential points
- Scatter plots

Skills Taught:

- Analyzing visual data
- Calculating and interpreting correlation coefficients
- Identifying and evaluating influential points

Materials Required

- The student version of this activity, 18 pages
- A graphing calculator, graphing software (e.g., Microsoft Excel), or other graphing technology

Activity Item

The following item is part of this activity. The item, its data source, and instructions for viewing the source data online appear at the end of this teacher version.

- Item 1: Unemployment Rates by Educational Attainment, 2014

For more information to help you introduce your students to the U.S. Census Bureau, read "*Census Bureau 101 for Students*." This information sheet can be printed and passed out to your students as well.

Standards Addressed

See charts below. For more information, read "*Overview of Education Standards and Guidelines Addressed in Statistics in Schools Activities*."

Common Core State Standards for Mathematics

Standard	Domain	Cluster
CCSS.MATH.CONTENT.HSS.ID.B.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	ID - Interpreting Categorical & Quantitative Data	Summarize, represent, and interpret data on two categorical and quantitative variables.
CCSS.MATH.CONTENT.HSS.ID.C.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.	ID - Interpreting Categorical & Quantitative Data	Interpret linear models.

Common Core State Standards for Mathematical Practice

Standard
CCSS.MATH.PRACTICE.MP4. Model with mathematics. Students will make scatter plots of data, calculating the correlation coefficients and analyzing the strength of the linear relationship and any influential points.
CCSS.MATH.PRACTICE.MP6. Attend to precision. Students will use precise statistical analysis to interpret the meaning of a linear model's correlation coefficient.

National Council of Teachers of Mathematics' Principles and Standards for School Mathematics

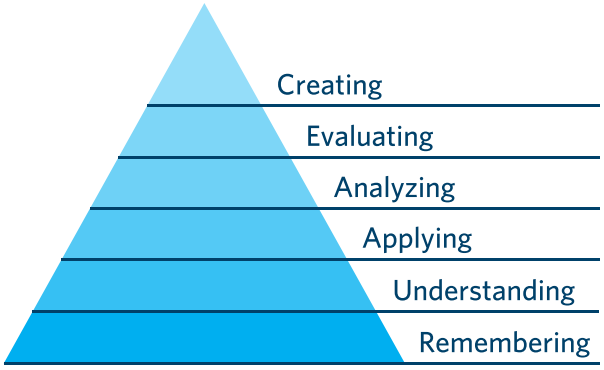
Content Standard	Students should be able to:	Expectation for Grade Band
Data Analysis and Probability	Select and use appropriate statistical methods to analyze data.	For bivariate measurement data, be able to display a scatterplot, describe its shape, and determine regression coefficients, regression equations, and correlation coefficients using technological tools.

Guidelines for Assessment and Instruction in Statistics Education

GAISE	Level A	Level B	Level C
Formulate Questions		X	
Collect Data			
Analyze Data			X
Interpret Results			X

Bloom's Taxonomy

Students will ***analyze*** data by creating scatter plots and calculating correlation coefficients. Then they will ***apply*** their knowledge of linear regression models to ***evaluate*** any influential points in the data distribution.



Teacher Notes

Before the Activity

Students must understand the following key terms:

- **Correlation coefficient (*r*)** – a measure of the strength of a linear relationship between two variables, whose absolute value indicates a stronger association when closer to 1 and a weaker association when closer to 0; the negative or positive sign of the coefficient indicates the direction of the relationship
- **Slope** – the rate of change in a linear model, or the amount by which a *y* value increases (for positive slopes) or decreases (for negative slopes) for every unit increase in an *x* value
- **Line of best fit** – a straight line drawn through the center of a group of data points on a scatter plot, showing how closely the two variables on the scatter plot are associated
- **Influential point** – a data point that significantly affects both the slope of the line of best fit and the correlation coefficient
- **Scatter plot** – a graph in the coordinate plane that displays a set of bivariate data and can be used to determine how two variables are associated (e.g., to show associations between the heights and weights of a group of people)

Students must understand the following concept:

- An association between two variables as falling along a continuum from weak to strong, as positive or negative, or as nonexistent

Students should have the following skill:

- Ability to create scatter plots

Teachers should explain to students that they will analyze 2014 data about educational attainment and unemployment in the United States and that the data come from the American Community Survey, which is conducted monthly by the Census Bureau and is designed to show how communities are changing. Through asking questions of a sample of the population, it produces national data on more than 35 categories of information, such as education, income, housing, and employment.

Teachers should divide students into groups of two to four to predict what the data on this topic will show, recording their predictions on the board, chart paper, or somewhere else visible in the classroom. Teachers could prompt students' thinking by asking questions like:

- Do you expect that the percentages for each educational level will be high or low?
- Do you expect that there will be a trend aligning educational attainment with low unemployment?
- Do you expect that the overall trend will be about the same for all states?

During the Activity

Students should complete the first question of the activity individually. After students complete the remainder of part 1 with their groups, teachers should facilitate a class discussion for each group to share responses with the class, pointing to specific data from **Item 1**. Teachers should record students' investigation questions in a visible place for their reference later in the activity.

To make this activity easier or shorter, teachers could let students calculate the value of *r* (questions 2 and 5 of part 2) using graphing technology, rather than by filling in the calculations tables by hand.

For question 1 of part 3, teachers could direct different students to analyze either specific education levels or a specific subset of states. After question 2 of part 3, teachers should pause to have students share their results with the class to provide a broader view of the various relationships between unemployment rates and educational attainment. Then at the end of part 3, teachers should have them share their responses in their groups and then with the class to practice developing evidence-based arguments. Teachers should have students complete part 4 individually.

After the Activity

Teachers should facilitate discussion among groups and then with the class about students' findings, including investigation questions and what they found most interesting or intriguing.

Extension Idea

Teachers could have students investigate rates of *employment*, rather than unemployment, from data.census.gov. Teachers could access the data on Census Bureau regions and divisions, respectively, by copying and pasting the following links:

https://data.census.gov/cedsci/table?q=S2301&hidePreview=true&tid=ACSST1Y2014.S2301&vintage=2018&g=0100000US_0200000US2,1,3,4

https://data.census.gov/cedsci/table?q=S2301&hidePreview=true&tid=ACSST1Y2014.S2301&vintage=2018&g=0300000US3,6,2,8,1,9,5,4,7

Student Activity

Click ***here*** to download a printable version for students.

Activity Item

The following item is part of this activity and appears at the end of this student version.

- Item 1: Unemployment Rates by Educational Attainment, 2014

Student Learning Objectives

- I will be able to make scatter plots of data.
- I will be able to calculate correlation coefficients using technology and by hand.
- I will be able to assess the strength of the linear relationship using correlation coefficients.
- I will be able to determine the impact of an influential point on the correlation coefficient.

Part 1 – Consider the Data

1. Examine **Item 1: Unemployment Rates by Educational Attainment, 2014.**
   a. What is one thing you notice? Which data values catch your attention?

      Student observations will vary but could include: In many cases, the unemployment rates decrease as education levels increase. The high overall unemployment rates of the District of Columbia, Mississippi, and Nevada catch my attention because they are all 7.7 percent.

   b. Write one question about the data that you could investigate.

      Student questions will vary but could include: Is there a relationship between educational attainment and unemployment rates? How does the typical unemployment rate for people with a bachelor's degree or higher compare with the rate for people with some college education or an associate's degree?

2. Share your responses to questions 1a and 1b with your group.
   a. Were they similar or different?

      Student responses will vary.

      •

      •

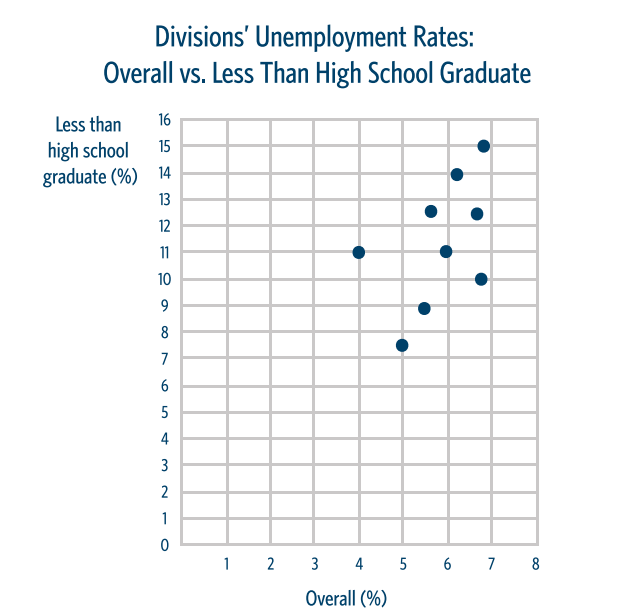
   b. Choose two interesting questions that your group could investigate.

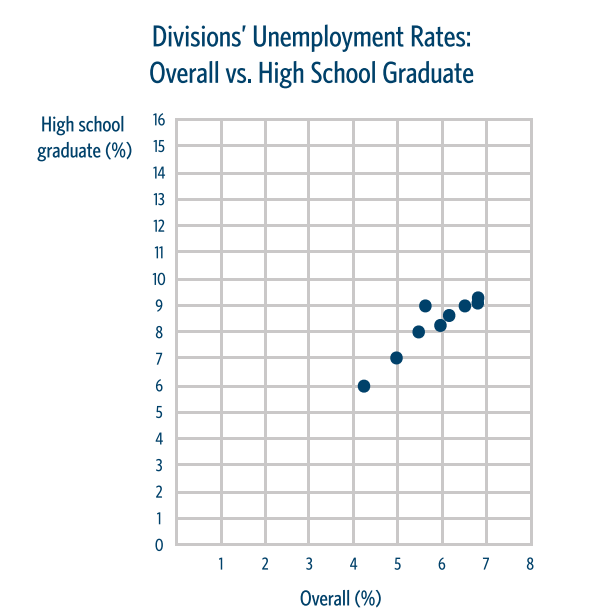
      Student questions below will vary but could include: Is there a relationship between educational attainment and unemployment rates? How does the typical unemployment rate for people with a bachelor's degree or higher compare with the rate for people with some college education or an associate's degree?

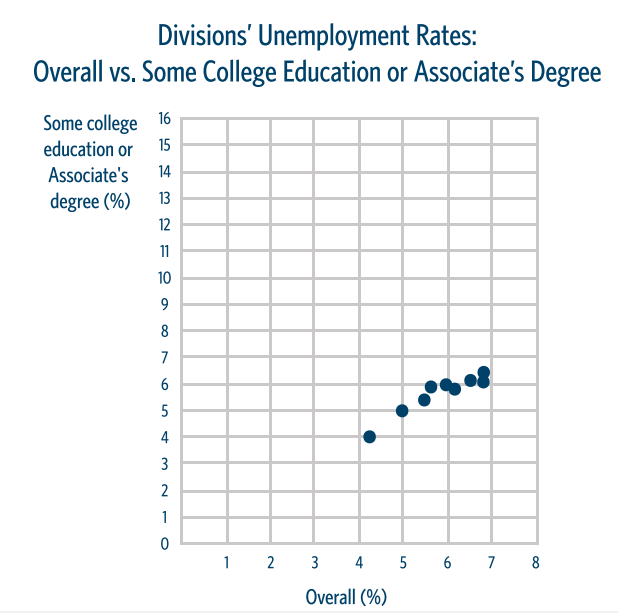
Part 2 – Analyze the Data

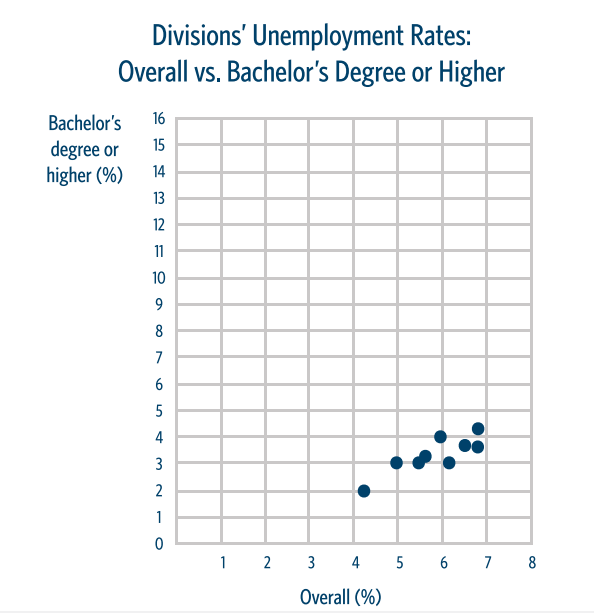
1. The U.S. Census Bureau divides the United States into four regions, which break down further into nine divisions that are each represented by a dot in the scatter plots below. These graphs compare each division's unemployment rate among people of different education levels with that division's overall unemployment rate in 2014. For example, in the top left graph, the point at (4.2, 10.6) is for a Census Bureau division that had an overall unemployment rate of 4.2 percent but whose unemployment rate among those who did not graduate from high school was 10.6 percent.

Divisions' Unemployment Rates: Overall vs. Educational Attainment Levels, 2014









a. Which two education levels' unemployment rates appear to be most strongly associated with the overall unemployment rates in a division? Explain.

The graphs for both high school graduate or equivalent and some college education or associate's degree show the strongest relationships between the two rates because the dots on these plots most closely follow a linear pattern.

b. Which education level's unemployment rates appear to be least strongly associated with the overall unemployment rates in a division? Explain.

The graph for less than high school graduate shows the weakest relationship between the two rates because the dots do not follow as strong a linear pattern.

c. The correlation coefficient is a measure of the strength of the linear relationship between two variables. The closer the correlation coefficient is to 0, the weaker the linear relationship. With this in mind, match each of the following correlation coefficients with the correct scatter plot from earlier. (Note: Your answers for the highest two coefficients can be interchangeable.)

- 0.54: **Overall vs. Less Than High School Graduate**
- 0.81: **Overall vs. Bachelor's Degree or Higher**
- 0.94: **Overall vs. Some College Education or Associate's Degree**
- 0.95: **Overall vs. High School Graduate or Equivalent**

2. The correlation coefficient, represented by r, is calculated using this formula:

$$r = \frac{\sum_{i=1}^{n}[(x_i-\overline{x})(y_i-\overline{y})]}{\sqrt{\sum_{i=1}^{n}(x_i-\overline{x})^2}\ \sqrt{\sum_{i=1}^{n}(y_i-\overline{y})^2}}$$

n = the number of data pairs
x_i and y_i = specific data points
$\overline{x}$ and $\overline{y}$ = the means of the x and y values
$\sum_{i=1}^{n}$ = find the sum of everything for the first pair (i=1) through the last (n)

Because the formula is complicated, using graphing technology is helpful when dealing with large data sets. Calculating values manually is possible for smaller data sets.

a. Use the data below — on unemployment rates overall and for people with some college education or an associate's degree in the four main regions identified by the Census Bureau — to complete the calculations table that follows. Note: Round your answers in the first two columns to two decimal places and those in the last three columns to four decimal places.

Unemployment Rates in Census Bureau Regions: Overall vs. Some College Education or Associate's Degree

Region	Overall (%)	Some College Education or Associate's Degree (%)
Northeast	5.9	6.4
Midwest	5.5	5.5
South	6.0	5.9
West	6.4	6.5
	Mean = 5.950	*Mean = 6.075*

Calculations Table for Correlation Coefficients

x_i	y_i	$x_i - \bar{x}$	$y_i - \bar{y}$	$(x_i - \bar{x})(y_i - \bar{y})$	$(x_i - \bar{x})^2$	$(y_i - \bar{y})^2$
5.9	6.4	**-0.05**	**0.33**	**-0.0165**	**0.0025**	**0.1089**
5.5	5.5	**-0.45**	**-0.58**	**0.2610**	**0.2025**	**0.3364**
6.0	5.9	**0.05**	**-0.18**	**-0.0090**	**0.0025**	**0.0324**
6.4	6.5	**0.45**	**0.43**	**0.1935**	**0.2025**	**0.1849**
			Sums:	(A) **0.4290**	**0.4100**	**0.6626**
				Square roots:	(B) **0.6403**	(C) **0.8140**

b. With these values now identified, the formula for correlation coefficients can be simplified to:

$$r = \frac{A}{B \cdot C}$$

A = the sum of all $(x_i - \bar{x})\ (y_i - \bar{y})$ values
B = the square root of the sum of all $(x_i - \bar{x})^2$ values
C = the square root of the sum of all $(y_i - \bar{y})^2$ values

Use the values for A, B, and C in the labeled boxes of your table to find the value of r, rounding to three decimal places.

r = 0.823

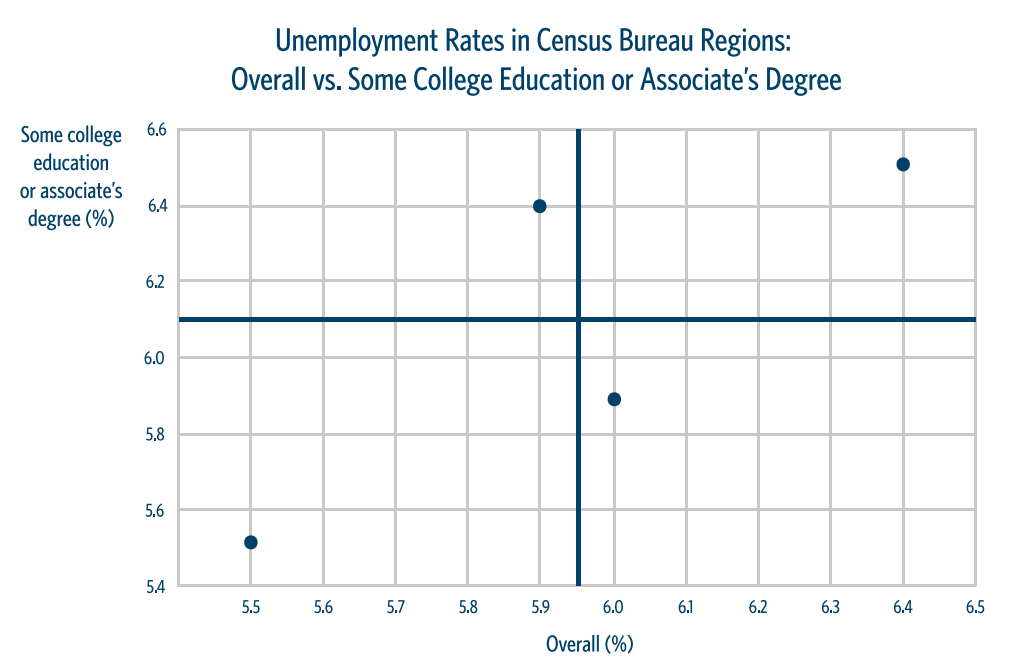
c. What does this r value indicate about the linear relationship between the two variables?

This value for r, 0.823, indicates that the relationship between the two variables is fairly strong; in other words, it is fairly close to a linear relationship.

3. Calculate both $\sum_{i=1}^{n} (x_i - \bar{x})$ and $\sum_{i=1}^{n} (y_i - \bar{y})$. Why will these sums, representing the combined distance of each data point from the mean, always result in this same value?

0 — these sums will always equal 0, because the total positive and total negative distances from the mean cancel each other out.

4. The following scatter plot shows unemployment rates overall and for people with some college education or associate's degree for the four Census Bureau regions, with lines for the means of each variable (i.e., $\bar{x}$ and $\bar{y}$) creating four quadrants. This setup helps you see the approximate distances of each data point from the means. (These distances are represented in the formula for r as $x_i - \bar{x}$ and $y_i - \bar{y}$.)



a. In which quadrants do the points have a greater impact on the value of the correlation coefficient? Explain.

The points in the upper right and lower left quadrants have a greater impact because they are farther from the means.

b. In which quadrants will $(x_i - \bar{x})(y_i - \bar{y})$ be positive for this data set? Negative?

This value will be positive for the points in the upper right and lower left quadrants and negative for the points in the upper left and lower right quadrants.

c. How do you know that the sum of these values, represented in the formula's numerator as $\sum_{i=1}^{n}[(x_i - \bar{x})(y_i - \bar{y})]$, will be positive for this data set?

The products of the distances from the mean for the points in the upper right and lower left quadrants are both positive, and greater than, the products for the points in the upper left and lower right quadrants, which are negative and smaller.

d. Why will the denominator of the formula, or $\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2}\ \sqrt{\sum_{i=1}^{n}(y_i - \bar{y})^2}$, always be positive?

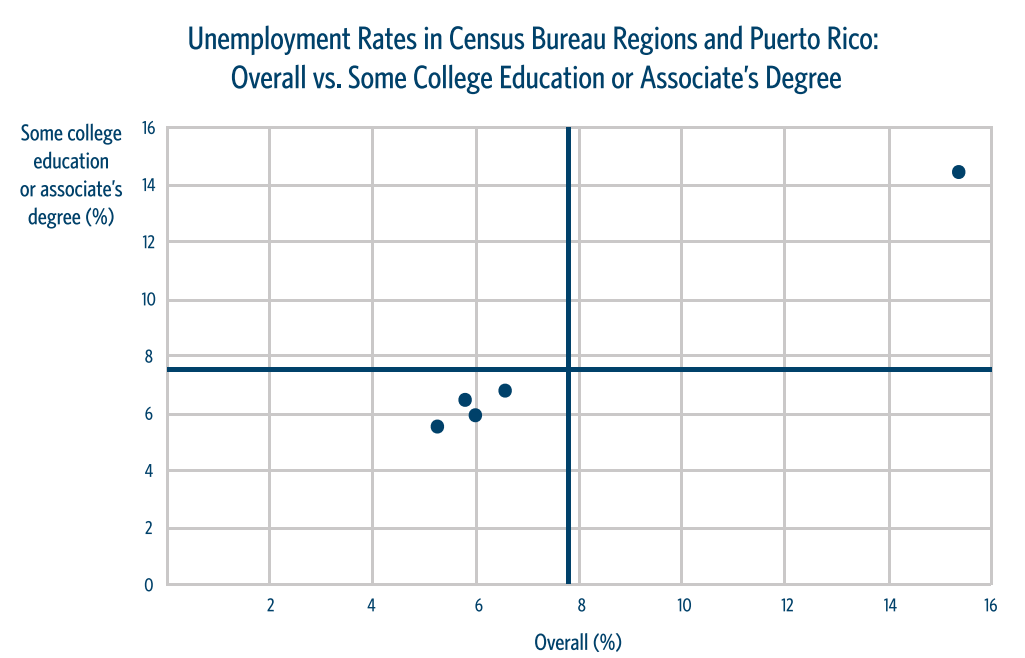
It is always the product of square roots of positive numbers.

e. Identify the largest and smallest possible values of *r* for any data set, and interpret what these values indicate for a linear relationship between two variables.

Largest possible *r* value: **1, indicating a perfect positive linear relationship between two variables**

Smallest possible *r* value: **-1, indicating a perfect negative linear relationship between two variables**

5. The following scatter plot includes the unemployment rates for Puerto Rico (15.2 percent overall; 14.3 percent for some college education or associate's degree), where the Census Bureau also collects data. The mean value lines have been adjusted accordingly.



a. Do you think this new data point will have a large or small impact on the value of *r*? Explain your logic.

Adding the data for Puerto Rico moves all the original data to the lower left quadrant, meaning that the values are smaller than their respective means. The data point for Puerto Rico is very far from the mean lines, in the upper right quadrant, which suggests that it will have a large impact on the value of the correlation coefficient, causing *r* to increase significantly.

b. Test your prediction by recalculating the values in your calculations table and then determining the *r* value. Don't forget to first calculate the new x and y means.

$\bar{x}$= **7.80** $\bar{y}$= **7.72**

x_i	y_i	$x_i - \bar{x}$	$y_i - \bar{y}$	$(x_i - \bar{x})(y_i - \bar{y})$	$(x_i - \bar{x})^2$	$(y_i - \bar{y})^2$
5.90	6.40	**-1.90**	**-1.32**	**2.508**	**3.610**	**1.742**
5.50	5.50	**-2.30**	**-2.22**	**5.106**	**5.290**	**4.928**
6.00	5.90	**-1.80**	**-1.82**	**3.276**	**3.240**	**3.312**
6.40	6.50	**-1.40**	**-1.22**	**1.708**	**1.960**	**1.488**
15.2	14.3	**7.40**	**6.58**	**48.692**	**54.760**	**43.296**
			Sums:	(A) **61.290**	**68.860**	**54.766**
				Square roots:	(B) **8.298**	(C) **7.400**

$$r = \frac{A}{B \cdot C} = \frac{\mathbf{61.290}}{\mathbf{8.298 \cdot 7.400}} = \mathbf{0.998}$$

c. How does your new *r* value compare with the original *r* value? What was the impact of adding the data for Puerto Rico to the original data set?

The new *r* value of 0.998 is greater than the original of 0.823, which indicates that the addition of this point greatly influenced the value of the correlation coefficient.

6. Some scatter plots contain influential points, which are data points that significantly affect both the slope of the line of best fit and the correlation coefficient. In regard to the correlation coefficient, a point is considered influential if it makes the association appear significantly stronger or weaker than it otherwise would be. Use mathematical evidence to explain why the data point for Puerto Rico would be considered an influential point.

This data point increases the correlation coefficient by 0.175, therefore indicating a stronger linear relationship than is actually the case between the overall unemployment rate and the unemployment rate for people with some college education or associate's degree.

Part 3 – Create Your Own Scatter Plots

1. Now use the data in **Item 1** to make your own scatter plot using graphing technology: Select at least 10 states (or the District of Columbia) and the unemployment rates for a specific education level, and plot them against the overall unemployment rates in each location you selected. Then use your scatter plot to answer the following questions and prompts.

   a. Does there appear to be a relationship between unemployment rates for this educational attainment level and the overall rates for these locations? If so, describe the relationship as linear or not linear, as strong or weak, and as positive or negative.

   Student answers will vary depending on the data selected.

   b. Determine the correlation coefficient using graphing technology.

   Student answers will vary depending on the data selected.

   c. How does the value of the correlation coefficient, *r*, confirm or refute your interpretation in question 1a?

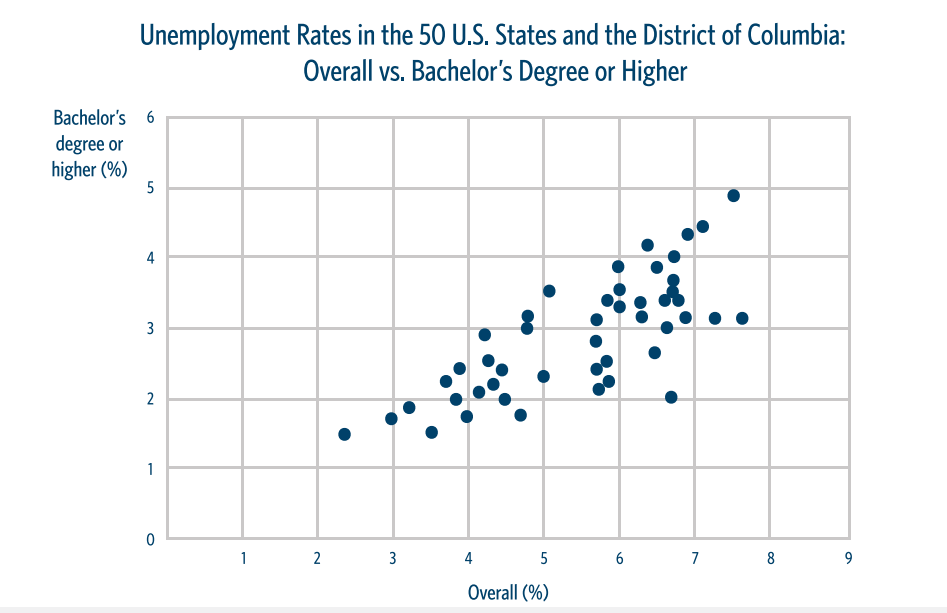
   Student answers will vary depending on the data selected.

   d. If your scatter plot contains an influential point, remove it and then recalculate the correlation coefficient. How did that data point influence the correlation? Explain.

   Student answers, if any, will vary depending on the data.

2. Next, use the data in **Item 1** for all 50 states and the District of Columbia to investigate the relationship between the unemployment rates of people with a bachelor's degree or higher and overall unemployment rates. Create a scatter plot with graphing technology and use it to answer the following questions:

   Below is a sample student scatter plot for teachers' reference.



a. Does there appear to be a relationship between the unemployment rates for people with a bachelor's degree or higher and overall unemployment rates? If so, describe this relationship as linear or not linear, as strong or weak, and as positive or negative.

There appears to be a fairly strong positive linear association that grows weaker going from the lower overall unemployment rates to the higher overall rates.

b. Predict a value for the correlation coefficient.

Student answers will vary, but given the fairly strong positive linear association in the scatter plot, a student could predict a 0.7 correlation coefficient.

c. Using graphing technology, determine the value of the correlation coefficient. How close was your prediction?

***r* = 0.770; student comparisons will vary.**

d. How does this actual value of *r* confirm or refute your interpretation in question 2a?

The value indicates a fairly strong, positive linear relationship, which is consistent with my observations of the scatter plot.

3. Based on what you have learned, would you agree or disagree that achieving higher levels of education makes you more employable? Explain, using specific data and the various analyses of your classmates from the discussion.

Student responses will vary.

Part 4 – Draw Conclusions and Review Key Concepts

1. What conclusions can you draw from your and your classmates' investigations? Consider how the percentage of unemployed people at a given education level relates to the overall unemployment rate for a set of states, regions, or divisions.

   Student answers will vary but could include: There is a general relationship between the percentage of unemployed people at a given education level and overall unemployment rates, but the relationship is stronger for some education levels than for others. Students could also mention that the percentage of people who are unemployed tends to be lower for higher levels of educational attainment.

2. Think back to the predictions you made before the activity. How accurate were they? Explain.

   Student answers will vary.

3. What is a correlation coefficient, and what can it tell you about the relationship between two variables?
   The correlation coefficient is a measure of the strength of a linear relationship between two variables.

4. Explain how to determine whether a data point on a scatter plot is influential.

   A data point is considered influential if it makes the linear relationship appear stronger or weaker than it otherwise would be. One way to determine whether a data point is influential is to remove it from the data set and recalculate the correlation coefficient. If there is a noticeable change in its value, the data point is influential.

Item 1: Unemployment Rates by Educational Attainment, 2014

Unemployment Rates by Educational Attainment Level for Each State and the District of Columbia (Aged 25 to 64)

	Overall (%)	Less Than High School Graduate (%)	High School Graduate or Equivalent (%)	Some College Education or Associate's Degree (%)	Bachelor's Degree or Higher (%)
Alabama	6.9	13.7	8.9	6.6	3.1
Alaska	6.7	14.0	12.0	5.8	2.0
Arizona	6.7	10.7	9.0	6.7	3.6
Arkansas	5.7	10.6	7.6	5.2	2.2
California	7.1	10.1	9.3	7.5	4.4
Colorado	4.3	7.5	5.4	4.7	2.9
Connecticut	6.6	13.9	9.0	7.1	3.8
Delaware	5.8	9.5	8.4	6.2	2.6
District of Columbia	7.7	14.6	17.6	14.6	3.1
Florida	6.9	12.1	8.7	6.5	4.3
Georgia	6.6	12.1	8.4	7.1	3.4
Hawaii	4.4	9.0	6.0	4.7	2.2
Idaho	4.5	8.9	5.6	4.4	2.4
Illinois	6.7	12.4	9.1	7.3	3.5
Indiana	5.7	11.9	7.4	5.5	2.5
Iowa	3.4	9.5	4.8	3.2	1.4
Kansas	4.2	8.3	5.9	4.3	2.1
Kentucky	6.3	13.7	7.9	5.8	3.1

Item 1: Unemployment Rates by Educational Attainment, 2014 (Continued)

	Overall (%)	Less Than High School Graduate (%)	High School Graduate or Equivalent (%)	Some College Education or Associate's Degree (%)	Bachelor's Degree or Higher (%)
Louisiana	6.0	12.4	6.6	5.8	3.2
Maine	5.0	11.1	7.0	5.2	2.3
Maryland	6.0	12.7	8.1	6.6	3.4
Massachusetts	5.8	11.9	8.6	6.6	3.3
Michigan	6.8	16.8	9.1	6.7	3.4
Minnesota	3.8	9.4	5.6	3.6	2.2
Mississippi	7.7	17.3	9.3	7.1	3.1
Missouri	5.7	14.3	7.5	5.6	2.8
Montana	4.0	10.0	5.8	4.1	1.6
Nebraska	3.2	8.4	4.5	2.8	1.8
Nevada	7.7	9.8	9.4	7.4	4.9
New Hampshire	4.3	8.3	6.2	4.5	2.5
New Jersey	6.4	10.4	8.6	7.0	4.1
New Mexico	7.3	13.6	9.1	7.4	3.1
New York	6.0	10.2	7.8	6.4	3.7
North Carolina	6.7	13.2	9.1	6.5	3.4
North Dakota	2.4	7.8	3.2	2.2	1.4
Ohio	5.8	15.5	7.0	5.9	2.6

Item 1: Unemployment Rates by Educational Attainment, 2014 (Continued)

	Overall (%)	Less Than High School Graduate (%)	High School Graduate or Equivalent (%)	Some College Education or Associate's Degree (%)	Bachelor's Degree or Higher (%)
Oklahoma	4.5	9.2	5.5	4.4	2.0
Oregon	6.7	13.7	8.5	6.6	4.0
Pennsylvania	5.7	13.1	7.0	6.0	3.1
Rhode Island	6.6	12.5	9.7	6.5	3.0
South Carolina	6.5	16.2	8.3	5.9	2.7
South Dakota	3.0	8.6	3.8	2.9	1.6
Tennessee	6.3	14.3	8.0	5.5	3.2
Texas	4.8	6.5	6.2	4.9	3.0
Utah	3.9	5.7	6.1	3.9	2.0
Vermont	4.7	12.0	7.2	4.9	1.9
Virginia	4.8	9.3	6.2	5.3	3.1
Washington	5.1	9.0	6.3	5.3	3.5
West Virginia	5.8	13.1	7.0	5.9	2.3
Wisconsin	4.5	10.5	5.5	4.6	2.4
Wyoming	3.9	12.8	4.5	3.3	2.4

https://data.census.gov/cedsci/table?q=S2301%3A%20EMPLOYMENT 20STATUS&g=0100000US.04000.001&hidePreview=true&tid=ACSST1Y2014.S2301

To view the source data, copy and paste the URL above into your browser.

Item 1: Unemployment Rates by Educational Attainment, 2014 (Continued)

Unemployment Rates by Educational Attainment Level for Each U.S. Census Bureau Region (Aged 25 to 64)

	Overall (%)	Less Than High School Graduate (%)	High School Graduate or Equivalent (%)	Some College Education or Associate's Degree (%)	Bachelor's Degree or Higher (%)
Northeast	5.9	11.2	7.8	6.4	3.5
Midwest	5.5	12.7	7.2	5.5	2.7
South	6.0	10.6	7.7	5.9	3.3
West	6.4	10.0	8.3	6.5	3.9

https://data.census.gov/cedsci/table?=S2301&hidePreview=true&tid=ACSST1Y2014.S2301&vintage=2018&g=0100000US_0200000US2,1,3,4

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Item 1: Unemployment Rates by Educational Attainment, 2014 (Continued)

Unemployment Rates by Educational Attainment Level for Each U.S. Census Bureau Division (Aged 25 to 64)

	Overall (%)	Less Than High School Graduate (%)	High School Graduate or Equivalent (%)	Some College Education or Associate Degree (%)	Bachelor's Degree or Higher (%)
New England	5.8	12.2	8.3	6.2	3.2
Middle Atlantic	6.0	10.9	7.7	6.4	3.6
East North Central	6.1	13.6	7.8	6.2	3.0
West North Central	4.2	10.6	5.8	4.0	2.1
South Atlantic	6.4	12.3	8.3	6.5	3.5
East South Central	6.7	14.5	8.4	6.1	3.1
West South Central	5.0	7.5	6.3	5.0	2.9
Mountain	5.6	9.6	7.4	5.6	3.1
Pacific	6.7	10.2	8.7	7.0	4.2

https://data.census.gov/cedsci/table?q=S2301&hidePreview=true&tid=ACSST1Y2014.S2301&vintage=2018&g=0300000US3,6,2,8,1,9,5,4,7

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